

SCOPUS

NECTAR-FEEDING OF SOME PLOCEINE WEAVERS

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INTRODUCTION

While studying woodpeckers and barbets in Kenya during July and August 1977, we observed closely several species of ploceines that persistently foraged for nectar in flowers. We have made an attempt to survey the literature of African ploceine weavers for previous observations of this phenomenon, and we provide a list of species for which such feeding has been reported. Included is mention of JFMH's and others' observations of nectar-feeding by fodies *Foudia* spp. of some Indian Ocean islands.

Weavers generally are held to be seed-eaters that feed on insects to some extent. Most insectivorous birds subject their prey to relatively little manipulation once it has been caught. We submit that the seed-eating habit, because it requires manipulation of seeds by the tongue and bill of the bird, actually favours diverse feeding adaptations in seed-eaters and their derivatives. Thus, in a sense, seed-eating 'pre-adapts' birds to a variety of feeding habits including nectar-feeding. For example, the Hawaiian honeycreepers and Australasian nectar-feeding parrots seem to have evolved from seed-eating ancestors. Hence it is not surprising to find weavers feeding on nectar.

Our 1977 observations in Kenya partly are the outcome of abnormally heavy rains from March to late August and thereafter. Following on the relatively dry period of the previous several years, the 1977 rains resulted in luxuriant growth and leafing of plants, and a burgeoning of diverse flowers throughout central and central southern Kenya.

OBSERVATIONS

Ploceus baglafecht Reichenow's Weaver and *P. xanthops* Holub's Golden Weaver: These species were reported to feed on nectar of sisal flowers by Cunningham-van Someren (1974), although the mode of obtaining nectar was not mentioned. At Karen, Nairobi on 2 and 3 July 1977 we observed many birds feeding at the flowers of a 20-m tall tree of the genus *Prunus*. The following species were represented: *Nectarinia venusta* (five or six birds), *N. mediocris* (two), *N. kilimensis* (five or six), *N. amethystina* (two), *N. senegalensis* (one), *Pycnonotus barbatus* (three), *Ploceus baglafecht* (three) and *P. xanthops* (eight to ten). Over the two days we spent about two hours observing the weavers at different times.

The Reichenow's Weavers usually were found in or near the flowering tree at any time we searched for them. They rapidly moved together from flower cluster to flower cluster. From a perch among the flowers a weaver would dip its bill into first one flower, then another, and so on, before moving to another cluster. Occasionally we noticed the fluid on the bill glistening in the sunlight.

Twice on 2 July, and once on 3 July, we watched a loose flock of eight to ten Holub's Golden Weavers for a total of 45 min feeding at this same tree. The birds systematically visited the flower clusters, more slowly dipping the bill into each flower than did the thinner billed Reichenow's Weavers, then climbed or flew to a nearby cluster and repeated the feeding. Sometimes they hung upside-down, tit-like, within a cluster. Several times we detected liquid glistening on, and even dripping from their bills as they lifted them from the flowers. There was no sign of insect foraging, or mandibulating; rather the weavers thrust the bill deep within the flower, momentarily held it there with no movement of the bill but with a distinct pumping movement of the throat, then lifted the bill and went to another flower. Occasionally we could see swallowing movements of the throat after the head was lifted. The birds did not wipe the bill after foraging in a flower, nor did they open and close the bill as if mandibulating insects. We carefully examined flowers from ten clusters on six different low branches. The flowers were lightly fragrant but full of nectar to the extent that the mere touch of the hand to a branch overhead caused nectar to drip over one. The nectar was moderately sweet. A few small insects including at least some dipterans were seen flying about the flowers, but close examination of the clusters disclosed no insects within the flowers we looked at.

We noted no interactions between the two species of weavers, although they sometimes were but three or four metres apart. Nor were there interactions with other birds in the tree. However, none of the many active sunbirds approached flower clusters at which weavers were feeding.

At 07:45 hrs on 8 July we observed an adult pair and an immature *P. baglafecht* 4 m from us foraging in the red flowers of *Ruttya fruticosa* (Acanthaceae). All three individuals went from flower to flower, pausing at each flower to dip the bill then pull the head back, swallow and proceed to another flower. Drinking-pumping movements of the gular area and throat were clearly visible, as was nectar all over the distal half of the bill. There was no sign of insects or indication of insect-feeding by the birds, which foraged in the manner described for about 6 min before flying off in a group. This species, but not Holub's Golden Weaver, is prominent at feeding stations in the Nairobi area, eating seeds of various sorts, and fruits including banana, mango and papaya.

G.R. Cunningham-van Someren (pers. comm.) has noted both these weavers taking nectar from flowers of *Grevillia robusta* and *Acrocarpus fraxinifolius*, and also *Leonotis nepetifolia*. He comments that many plants from which nectar is taken by Kenya birds are exotic, and hence experience with native plants such as *Leonotis* must have formed the basis for birds, including these weavers, shifting to exotic flowering plants.

Ploceus (velatus) vitellinus Vitelline Masked Weaver: Rowan (1971) listed the South African form (*velatus* group, these are merged in *Ploceus velatus* by Moreau 1962, White 1963, and Morony, Bock & Farrand 1975) of *P. velatus* as feeding on nectar, with no mention of its mode of feeding. On 24 July at Olorgesailie Prehistoric Site of the National Museums of Kenya, about 55 km south of Nairobi, we encountered a female Vitelline Masked Weaver in a mass of orange *Leonotis nepetifolia* flowers. This bird moved up one after another flower stalk foraging for nectar by biting at the base of each flower, pulling it out, and mandibulating the flower base, thus destroying the flower. We watched the systematic nectar-feeding endeavours of this female for over 5 min. During this period no other bird visited the small clump of these flowers. There were few flowers of

any kind in the vicinity of Olorgesailie, which had had less rain than Nairobi, so the plants were late in flowering. Since these flowers are important to at least *Anthreptes collaris* and *Nectarinia pulchella* - common sunbirds in the area - the destruction of the flowers by the weavers, if at all commonplace, might be a restrictive factor in the feeding regime of those sunbirds.

Quelea cardinalis Cardinal Quelea: at 15:00 hrs on 6 August outside Tanguu Bei northeast of Lake Baringo we saw much bird movement in a patch of flowering *Leonotis nepetifolia* of about 1 ha in area. Together with numbers of the sunbirds *Nectarinia senegalensis* and *Anthreptes collaris* in the flower mass, were two fully adult male Cardinal Queleas, well spaced apart. We watched the queleas forage by dipping their bills into the flowers, going from flower to flower on each stalk, and moving systematically from one flower stalk to another. The queleas showed nectar on their bills, although we could not detect throat-pumping movements. Each male interacted aggressively with at least one individual of both species of sunbird noted above. In all the 11 or 12 encounters the quelea attacked and supplanted the sunbird. From our observations over a 15-min period we concluded that the queleas were eating nectar and were dominant to the sunbirds.

Foudia spp. fodies: some of the observations of nectar-feeding in fodies are being prepared for publication as part of the report of the British Ornithologists' Union Mascarene Island project, and hence we only summarize them here. Frequently on Réunion, and on several occasions in Madagascar, JFMH observed *Foudia madagascariensis* eating nectar in the manner of *Ploceus velatus*, i.e., by pulling out floral parts and mandibulating their bases. She also saw *Foudia rubra* on Mauritius and *F. flavicans* on Rodriguez frequently 'drinking' nectar from flowers of various species, not destroying them. These two fodies, both having a brush-tipped tongue, may indeed be greatly dependent on nectar. According to A.W. Diamond, the Seychelles' *Foudia sechellarum* regularly eats nectar in the manner of *Ploceus velatus*, and he comments (*in litt.*) that although *F. madagascariensis* less frequently feeds in this way, it "seems to be adopting this method more often, apparently learning it from *sechellarum*." *Foudia eminentissima* of Aldabra has been noted feeding "on flowers" by Gaymer (1967), referred to by Benson & Penny (1971).

DISCUSSION

The modest literature from southern Africa on nectar-feeding by ploceine weavers shows some controversy over whether the birds feed on nectar at flowers, or take pollen, or both. Rowan (1974) and Skead (1975) reported *Ploceus capensis* and *P. cucullatus* feeding on pollen of the common southern African *Strelitzia reginae*, and this habit seems sufficiently common to make it likely that these weavers are major pollinators of this plant, for which no other natural pollinating agents are known. The nectar of *Strelitzia* seems not to attract weaverbirds; although its nectar may be ample and conspicuous, it is, at one stage, unpleasant in smell and taste to man - perhaps explaining why birds seem not to utilize it. McLachlan & Liversidge (1957: 428) reported that *Ploceus intermedius* feeds on the flowers of aloes, "pollen from which often gives the birds orange faces," and that *P. capensis* often has its forehead discoloured with pollen from its flower-feeding activities. Whether pollen, nectar, or both are taken is in question.

Oatley (1964) published on 43 species of birds of 21 families that

probed into the flowers of *Aloe marlothii*. Included are *Ploceus ocularis*, *P. subaureus*, *P. velatus*, *P. cucullatus* and *P. bicolor*, all of which, except the last, are 'addicted' to probing into the flowers. Skead (1964: 227) noted that *Ploceus capensis*, *P. subaureus*, *P. velatus* and *P. cucullatus* are "influenced by flowering plants and trees," and that the "tall, brightly flowered *Erythrina caffra* trees attract them in large numbers." He continued, "the presumption is strong that the nectar in the blossoms is the attraction."

Nectar-feeding by *Ploceus cucullatus* was discussed by Collias & Collias (1971) who found that these weavers feed at blossoms of various trees, and (p.3) "The Tree Fuchsia *Schotia brachypetala* was especially popular for nectar." The birds also fed on flowers of some plants, such as *Cassia abbreviata*. Even in the breeding season adults of this weaver take nectar, for example of the buffalo thorn *Zizyphus mucronota* (Collias & Collias 1971: 11).

Rowan (1971: 347, Table 4) reported nectar-feeding in seven South African species of *Ploceus*, as we indicate in Table 1. All seven also feed to some extent on insects, all but *P. bicolor* eat seeds as well, all but *P. intermedius* and *P. ocularis* sometimes take fruits, and the four species other than *P. subaureus*, *P. intermedius* and *P. bicolor* have also been noted eating flower parts (possibly for nectar).

TABLE 1
Nectar-feeding *Ploceinae*

Species	Location	Authority
<i>Ploceus baglafecht</i>	Kenya	Cunningham-van Someren (1974) and this study
<i>Ploceus ocularis</i>	South Africa	Rowan (1971)
<i>Ploceus capensis</i>	South Africa	Rowan (1971)
<i>Ploceus subaureus</i>	South Africa	Rowan (1971)
<i>Ploceus xanthops</i>	Kenya	Cunningham-van Someren (1974) and this study
<i>Ploceus intermedius</i>	South Africa	Rowan (1971)
<i>Ploceus (velatus) vitellinus</i>	Kenya	this study
<i>Ploceus (velatus) velatus</i>	South Africa	Rowan (1971)
<i>Ploceus cucullatus</i>	South Africa	Rowan (1971)
<i>Ploceus bicolor</i>	South Africa	Rowan (1971)
<i>Quelea cardinalis</i>	Kenya	this study
<i>Foudia madagascariensis</i>	Réunion, Seychelles	this study (*)
<i>Foudia rubra</i>	Mauritius	this study
<i>Foudia sechellarum</i>	Seychelles	(*)
<i>Foudia flavicans</i>	Rodriguez	this study
<i>Euplectes albonotatus</i>	South Africa	Oatley & Skead (1972)
<i>Euplectes ardens</i>	South Africa	Oatley & Skead (1972)

(*) denotes a personal communication by A.W. Diamond reported in this paper

Oatley & Skead (1972) listed 73 species of birds feeding on 14 aloes and eight other flowering plants. They discussed various problems relating to nectar-feeding, in particular, is nectar used for food or drink? They concluded that many of the nectar-feeders also drink water actively,

and, if anything, nectar-feeding causes more drinking because of the high sugar content of the nectar. Also noted by these authors is the adaptability of weavers and other birds in securing nectar, for when nectar is less accessible because of the structure or location of a flower, some weavers may simply tear out the entire flower and mandibulate it to obtain the nectar, in the manner described above for *Ploceus (velatus) vitellinus*. This method may also be used to obtain nectar from immature flowers. Oatley & Skead (1972: 72) list eight weavers (see our Table 1) as feeding on nectar. Two of the eight species, *Ploceus capensis* and *P. velatus* fall into their category of birds (numbering ten of the 73 species) that feed more than casually on nectar.

Of the eight ploceine birds Oatley & Skead report as using nectar, the two species of *Euplectes* were seen feeding on nectar only at aloes. *Ploceus bicolor* fed at flowers of *Erythrina caffra*, a tree. The other five species, all of the genus *Ploceus*, used aloes and other plants as well, with two aloes and two other plants listed for *Ploceus ocularis*, four aloes, an agave, and a tree for *P. capensis*, an aloe and a tree for *P. subaureus*, three aloes and two trees for *P. velatus*, and three aloes and one tree for *P. cucullatus*. These authors also noted nectar-feeding in three species of *Passer* and in *Petronia superciliosus* of the Passerinae, but Morony, Bock & Farrand (1975) suggest that the Passerinae are not related to the Ploceinae, and we do not treat the Passerinae further in this paper.

Skead (1975) reported *Ploceus cucullatus* pulling out the flower tubes of the Cape Honeysuckle *Tecomaria capensis* to obtain the nectar from their bases, as in *Ploceus (velatus) vitellinus*.

Thus, 16 species (or 17 if *Ploceus (velatus) vitellinus* be considered a full species) of ploceine weavers, including nine species of *Ploceus*, one of *Quelea*, four of *Foudia*, and two of *Euplectes* (see Table 1) have been reported eating nectar. A number of the species noted feeding on nectar in South Africa also occur in Kenya, and observers in Kenya should seek data on their foraging habits. Careful observation is needed to determine whether nectar or pollen is being taken by birds at flowers, and, if nectar is being taken, the methods of obtaining it need to be documented. We wonder if the destruction of flowers by ripping them out and mandibulating, or eating them (as by *Colius* spp.) could significantly reduce the numbers of flowers available for nectar-feeders in some places at certain times. For example, might such actions have a detrimental effect on some birds that regularly visit the same flowers to secure their necessary nectar? The frequency and importance of nectar-feeding by ploceines are matters that demand investigation, but it appears that some, or even many, ploceine weavers obtain nectar with regularity, and some of them (*Foudia* spp.) may depend upon it to a great extent.

The documentation of nectar-feeding by ploceines, and of other feeding habits of birds which are opportunistic, or do not fit the usually cited habits or foods, is necessary before an assessment can be made of the ecological significance of such habits. Not only those interested in the ecology and life history of the birds, but also those concerned with the evolution of adaptation and those studying the anatomy of a 'seed-eater's' bill and skull structure ought to be aware of divergent foraging modes that are used by these birds.

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